~~Patent Claims~~

1. A device for etching a substrate (10), in particular, a patterned silicon body with the assistance of a plasma (14), having a plasma source (13) for generating a high-frequency electromagnetic alternating field, it being possible for a high-frequency power to be applied to the plasma source with the assistance of a high-frequency generator (17), and having a reactor (15) for generating the plasma (14) from reactive particles through the action of the high-frequency electromagnetic alternating field upon a reactive gas or a reactive gas mixture, characterized in that provision is made for a first means producing a periodical change in the high-frequency power applied to the plasma source (13).

2. The device as recited in Claim 1, characterized in that the first means is a component for controlling the power of the high-frequency generator in which component a digital ramp generator is programmed via a software or in that the means is a component (18) for controlling the power of the high-frequency generator which component has an analog ramp generator (19).

3. The device as recited in Claim 2, characterized in that the analog ramp generator (19) has an RC circuit (23, 24, 25) which, in particular, is provided with at least one diode.

4. The device as recited in Claim 1, characterized in that provision is made for a second means which, during the periodical change in the high-frequency power applied to the plasma source (13), at least temporarily adapts the output impedance of the high-frequency generator (17) to the prevailing impedance of the plasma source (13) which changes as a function of the high-frequency power.

5. The device as recited in Claim 4,
characterized in that the adaptation of the output impedance is carried out continuously or stepwise and that it is automated and in that the applied high-frequency power lies between 400 W and 5000 W.

6. The device as recited in Claim 4,
characterized in that the second means is an impedance transformer (16).

7. A method for anisotropically etching a substrate (10) with a device as recited in at least one of the preceding Claims, the anisotropic etching process being carried out in separate etching and polymerization steps alternatingly following each other, and a polymer being applied to lateral patterns defined by an etching mask during the polymerization steps, the polymer being removed again in each case during the subsequent etching steps,
characterized in that, during the etching steps, at least temporarily, an in each case higher high-frequency power is applied to the plasma source (13) than during the deposition steps.

8. The method as recited in Claim 7,
characterized in that, during the etching steps, at least temporarily, a high-frequency power of 800 watts to 5000 watts, in particular, of 2000 watts to 4000 watts is applied to the plasma source (13), and in that, during the deposition steps, at least temporarily, a high-frequency power of 400 watts to 1500 watts, in particular, of 500 to 1000 watts is applied to the plasma source.

9. The method as recited in Claim 7,
characterized in that the increase in the high-frequency power during the change from the deposition steps to the

etching steps and/or the decrease in the high-frequency power during the change from the etching steps to the deposition steps are carried out stepwise or continuously.

10. The method as recited in Claim 9, characterized in that at least the increase in the high-frequency power is carried out in such a manner that during this time, at least temporarily, the impedance of the high-frequency generator (17) is adapted to the plasma impedance at least approximately in a an, in particular, continuous or stepwise and automated manner via the second means, in particular, via the impedance transformer (16).

11. The method as recited in Claim 9, characterized in that the duration of the increase in the high-frequency power during the change from a deposition step to an etching step is 0.2 sec to 5 sec, in particular, 0.5 sec to 3 sec and/or that the duration of the decrease in the high-frequency power during the change from an etching step to a deposition step is 0 sec to 2 sec, in particular, 0 sec to 0.5 sec.

12. A device for igniting a plasma (14) and for adjusting upward or pulsing a plasma power, having a plasma source (13), in particular, an inductive plasma source, for generating a high-frequency electromagnetic alternating field, it being possible for a high-frequency power to be applied to the plasma source with the assistance of a high-frequency generator (17), and having a reactor (15) for generating the plasma (14) from reactive particles through the action of the high-frequency electromagnetic alternating field upon a reactive gas or a reactive gas mixture,
characterized in that provision is made for a means which permits the adjustment of a continuous or stepwise

increase in the high-frequency power applied to the plasma source (13), starting from a starting value, to a target value.

13. The device as recited in Claim 12, characterized in that the means is a component for controlling the power of the high-frequency generator (17) in which component a digital ramp generator is programmed via a software or in that the means is a component (18) for controlling the power of the high-frequency generator (17) which component has an analog ramp generator (19).

14. The device as recited in Claim 12, characterized in that provision is made for an impedance transformer (16) which, during the increase in the high-frequency power, at least temporarily, adapts the output impedance of the high-frequency generator (17) to the prevailing impedance of the plasma source (13) in a an, in particular continuous or stepwise and automated manner, the impedance of the plasma source changing as a function of the high-frequency power.

15. A method for igniting a plasma (14) and for adjusting upward a plasma power with a device as recited in at least one of the Claims 12 through 14, characterized in that the continuous or stepwise increase in the high-frequency power from the starting value to the target value is accompanied by an at least temporary impedance adaptation of the high-frequency generator (17) to the prevailing plasma impedance via the second means, in particular, via the impedance transformer (16).

16. The method as recited in Claim 15, characterized in that the starting value is 0 to 400 watts and the target value is 800 watts to 5000 watts, and in that the increase of the starting value to the

target value is carried out over a period of 0.2 sec to 5 sec, in particular, 0.5 to 2 sec.

17. The method as recited in Claims 15 or 16, characterized in that the plasma (14) is ignited and adjusted upward in a time-pulsed manner.